

LITHOGRAPHIC PRINTING WITH POLARIZED LIGHT

ABSTRACT OF THE DISCLOSURE

The present invention provides systems and methods for improved lithographic printing with polarized light. In embodiments of the present invention, polarized light (radially or tangentially polarized) is used to illuminate a phase-shift mask (PSM) and produce an exposure beam. A negative photoresist layer is then exposed by light in the exposure beam. A chromeless PSM can be used. In further embodiments of the present invention, radially polarized light is used to illuminate a mask and produce an exposure beam. A positive photoresist layer is then exposed by light in the exposure beam. The mask can be an attenuating PSM or binary mask. A very high image quality is obtained even when printing contact holes at various pitches in low k applications.